Patrick Bayou Superfund Site

Project Status &
Benthic Risk Assessment

January 30, 2013

Presented by

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Houston, TX

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Agenda

1. Deliverable Projections for 2013
2. Benthic Risk Assessment
   - JDG has completed an alternative evaluation of benthic risk
   - Today we will present the evaluation to EPA
   - Next step is to prepare final response to comments and submit the final, revised BERA report to EPA, TCEQ & Trustees

Patrick Bayou
Deliverable Projections

Task	2013											
	1	2	3	4	5	6	7	8	9	10	11	12
BERA (Final RTC & Report)	■	■										
Technology Screening (draft to EPA)	■	■										
Chemical Fate & Transport (draft to EPA)	■	■	■	■	■							
RI Report (draft to EPA)	■	■	■	■	■	■						
Feasibility Study (draft to EPA)	■	■	■	■	■	■	■	■	■	■	■	■

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Benthic Toxicity Approach

Presented by
AnchorQEA, LLC

January 30th, 2013

Benthic Risk Assessment

- Objectives
  - Provide assessment of benthic risk
  - Consider three lines of evidence: toxicity, chemistry, and benthic community data
  - Focus on approaches discussed with EPA at December meeting

Benthic Risk Assessment

- Approach
  - Visually evaluate association between sediment chemistry (mean PEL-Q), low survival (toxicity), and low benthic community indices
  - Identify areas that consistently do or do not show associations between the three lines of evidence

Benthic dataset

- Analysis based on co-located sediment toxicity, chemistry, and benthic community samples
  - 2000 – 2006 TMDL / TCEQ studies
    - 12 stations (gunite and upstream samples excluded)
    - 30 discrete samples
    - 30 sediment chemistry analyses
    - 75 toxicity test results
      - Multiple species tested for each sample
    - 23 community evaluations

Sediment Toxicity

- Categorize toxicity:
  - Toxic < 60% survival
- Determine the proportion of toxic results for each sample and station
  - Proportion toxic = Toxic results / Total results
  - Pool all test species together

Sediment Chemistry

- Compare relative differences in optimized PEL-Q within Site
  - Determine % difference from median of the optimized mean PEL-Q:

    $PEL\text{-}Q\ \%\Delta = ([PEL\text{-}Q]-[PEL\text{-}Q]_{median}) / [PEL\text{-}Q]_{median} * 100$

Benthic community

- Environmental conditions (e.g., salinity), lack of truly specific benthic index, and reference area uncertainty preclude identification of 'stressed' locations relative to areas outside of Site
- Relative comparisons of benthic conditions within site are relevant
  - Calculate benthic index (ES-BI) using only Site data to evaluate relative benthic conditions
  - Calculate ES-BI by seasonal groups

Benthic Community

- Engle & Summers Benthic Index (ES-BI):
  - Can be calculated using reference data or without (relative score)
  - Incorporates several relevant metrics:
    - Percentage of expected species diversity
    - Mean abundance of tubificid oligochaetes
    - Percent (relative abundance) of capitellid polychaetes
    - Relative abundance of bivalve mollusks
    - Relative abundance of amphipods
  - Has been peer-reviewed and is widely used

Line of Evidence Comparisons

- Use simple categorical approach for each station
  - Proportion toxic
    - => 50% - Probable Risk
    - 50-25% - Indeterminate Risk
    - <=25% - Low Risk
  - Average PEL-Q %Δ
    - Highest 15% - Probable Risk
    - Above average – Indeterminate Risk
    - Below average – Low Risk
  - Average benthic index
    - Lowest 15% - Probable Risk
    - Below average – Indeterminate Risk
    - Above average – Low Risk

Comparison of Categorical Classification

Station	Proportion Toxic	Relative Mean PEL-Q	Relative Benthic Index
V	0%	Low	Indeterminate
2.5	0%	Low	Low
S	0%	Low	Low
E	25%	Low	Low
U	0%	Low	Indeterminate
3	31%	Low	Low
G	25%	Low	Low
4A	54%	Probable	Indeterminate
5	25%	Low	Indeterminate
T	0%	Low	Low
6A	69%	Probable	Probable
Q	25%	Low	Indeterminate

Key:	Toxicity	Mean PEL-Q	Benthic Index
Probable	> 50% Toxic	Highest 15%	Highest 15%
Indeterminate	25-50% Toxic	Above Average	Above Average
Low	<= 25% Toxic	Below Average	Below Average

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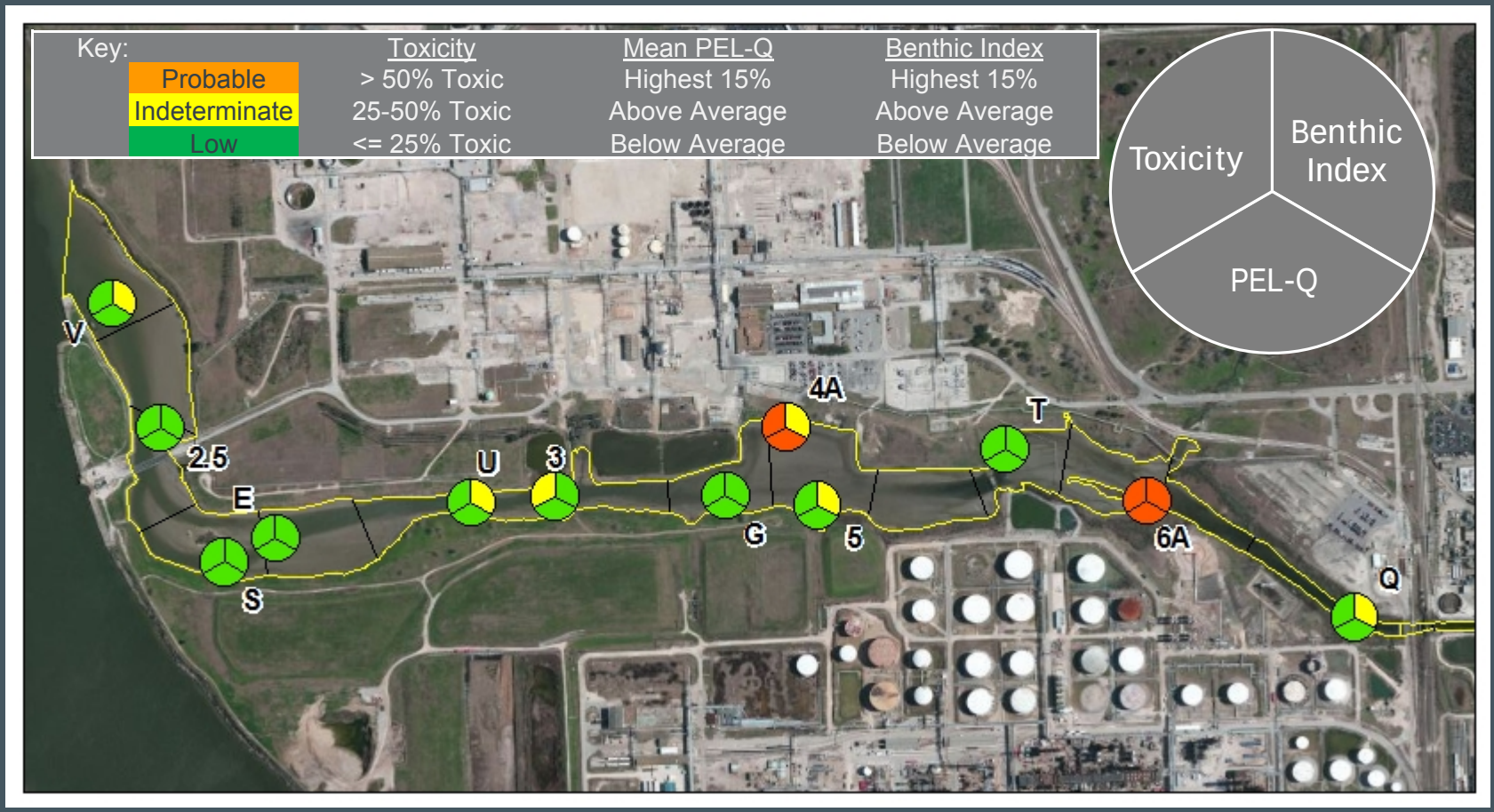
Spatial Distribution



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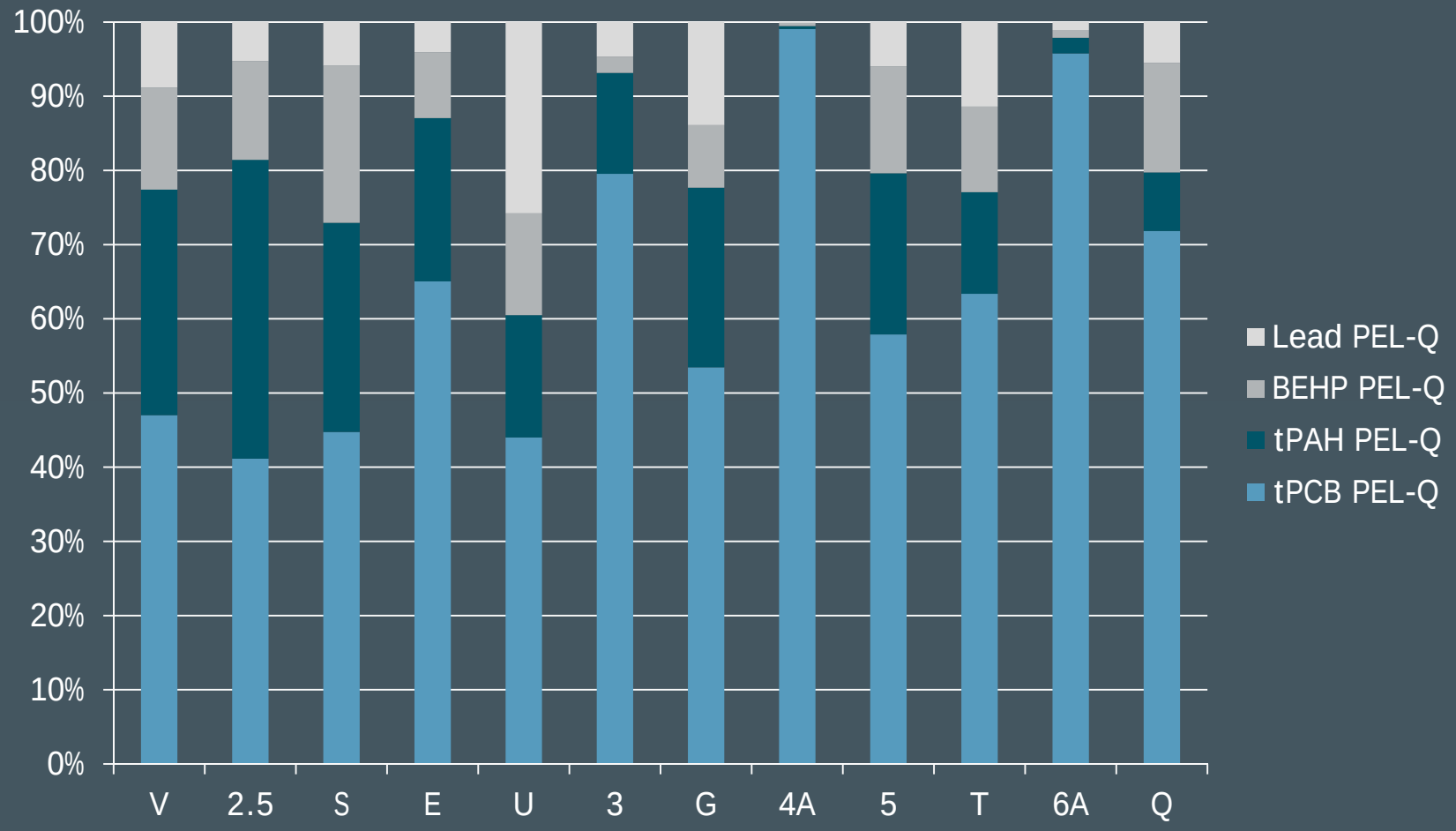
Results

- Six of 12 stations are categorized as low risk based on toxicity, chemistry, and benthic community condition
- Five of 12 stations are categorized as indeterminate risk based on these LOE
- Two of 12 locations (4A and 6A) demonstrate probable risk based on these LOE

Relative COPC contribution to Mean PEL-Q



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Summary

- Apparent association between toxicity, chemistry, and benthic community condition exists
- PCBs appear to be the primary COPC of concern to benthos
- PCBs will be addressed in the FS through actions taken to address water quality concerns